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Classification Approaches for Mezo-Systems: Spatial-Branch Aspect

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The role and types of mezo-economic systems are considered, their place in the classification of economic systems. Management of logistics systems as part of mezo-economic have their own peculiarities of formation and management. The effectiveness of managing logistic systems of associations of organizations depends on the form of their formation. The author proposes an extended classification of logistics systems created in the framework of mezo-economic ones, examples of identification of mezo-logistics systems in the economy at the sectoral and territorial levels are given, which allows further selection of management methods.

Keywords: mezo-economic system, mezo-logistics system, network integration, supply chain.

1. INTRODUCTION

The development of the market is based on freedom of choice and entrepreneurial activity. This condition makes central control impossible. At the same time, the presence of interrelations between enterprises, the growth of the number of logistics providers stimulate the processes of integration and the search for new types of their associations.

The issues of managing systems in logistics, the methodology of research of logistics systems, as well as the processes of their formation and development are considered in the works of Russian scientists. However, mainly these works are devoted to the analysis of micro- or macro-logical systems. It should be noted that the spatial and sectoral aspects of the formation of logistics systems at the level of mezo-economy, namely at the level of enterprise associations remain open to consideration [1]. The classification of mezo-logic systems can make it possible to identify its subtype and propose appropriate management methods in a specific association.

Another aspect of the study of mezo-logic systems is the need to search for management methods for unincorporated systems (consortium, association or cluster). At the moment, the management methods existing in science and practice are mostly developed for corporations. In the future, the definition of a subtype of the mezo-logic system would facilitate the most effective choice, both the forms of association, and the conditions and target criteria for their management. In logistics, as part of economic science, there are the same signs of the classification of systems that in the economic theory and management. From the standpoint of economic theory, logistics systems are divided into three groups according to the principle of functional and territorial level of management tasks: micro-logistic, macro-logistic and mezo-logistic. Mega-logistic systems also exist in Russian scientific literature.

2. MAIN PART

The classification of micro, mezo- and macro-economic systems in logistics serves as a starting point for determining the place and role of the logistics system in economic systems.

Mezo-economic systems are considered to be intermediate, in their structure, economic systems, which are a set of medium-sized forms

of management [2, p. 243-24]. Mezo-economic systems have such distinctive features as: the presence of common shared ownership, labour cooperation, new types of division of labour, sectoral and territorial division.

Mezo-economic associations are characterized by corporate and contractual forms of links between enterprises as subjects of the market system.

Traditional forms of mezo-economic associations include: the system of participation, holding, trust company, conglomerate, consortium, cartel, syndicate, trust, pool, association and strategic alliance.

The logistical system within the framework of mezo-economic association is created with the purpose of optimization of material and accompanying flows and is managed by people, being artificial, that generates its further transformation. Focusing on the sign of the complexity of the system, taking into account the level and depth of the tasks to be solved, mezo-logic systems in science are considered as materials-conducting systems created by the efforts of the partners of the logistics process, which consist in contractual relations (contractors) [3,4,5]. Thus, that mezo-logic systems include organizations, united by material and information flows, having different sectoral or territorial affiliation.

Based on the views of scientists outlined above, it can be concluded that mezo-logic systems are associations of sectoral, inter-sectoral or inter-territorial nature, connected not only by material flows, but also by the infrastructure supporting them.

Differentiation of management structures makes it possible to distinguish such features of systems as: degree of organization (well organized, poorly organized or diffuse); management structure (centralized and decentralized); dimensionality (one-dimensional and multidimensional); homogeneity and diversity of structural elements (homogeneous and heterogeneous); ability to set goals (casual and purposeful).

Consideration of all classification characteristics of systems and their adaptation in the field of logistics allowed to formulate an author's view of the mezo-logical system, both from the position of its role in the process of integration of economic systems, and from the standpoint of its characteristic characteristics in classifications of systems as a whole.

The author's opinion on the conditions and objectives of the formation of mezo-logical systems, as well as their role in places in the process of economic integration, is as follows:

1. Firstly, the mezo-logical system in the aspect of economic theory is a subsystem of the same mezo-economic system, which unites enterprises with different sectoral or territorial features. Functionally mezo-logical system provides management of material flows in mezo-economics, due to which the main goal of its activity is inter-system integration.
2. Secondly, in the aspect of territorial management, the mezological system unites the participants in the stream processes of one territorial system having different industry affiliation. The purpose of forming such a system is to optimize the resources of various companies and shorten the delivery time.
3. Thirdly, the mezo-logical system is considered as a subsystem of an industry company that unites material flows within the interterritorial interaction of its divisions. In this case, the basic goal of mezo-logical system formation is creation of supply chains, formation of network interaction of company divisions.

Based on the above statements, it is logical to conclude that there is a connection between the formation of mezo-logical systems, the processes of interaction between macro- and microsystems, as well as the processes of coordination of their efforts in order to optimize material, information, financial flows.

If the feature of the mezo-economic system is the fulfilment of the role of an interindustry or interterritorial integrator, the mezo-logical system is characterized by the function of an integrator of stream processes between enterprises of different industries that have similar territorial conditions for the formation of supply chains.

General scientific classifications are of particular are important for the classification of logistics systems. This trip make it possible to identify logistics system ability to modify and transform, as well as to preserve stable states in a conflict situation.

One of the principles of effective functioning and sustainability of logistics systems is the use of a homeostatic approach that allows achieving intra-system balance by managing conflict zones.

The processes of network integration of the national and world economy, the development of the system of transnational corridors and the globalization of supply chains, the computerization of logistics and transport processes had a significant impact on the development of mezo-logical systems. That is defined their new roles, which required the addition of their classification characteristics.

The principle of integration is seen through the development of artificial intelligence systems and leads to the formation of built-in virtual. That is, information-analytical systems. The use of virtual systems facilitates the adoption of rational management decisions based on the pooling of partner databases.

Thus, one of the tasks of the mezo-logical system is the collection, processing and analysis of data on the state of the micro-logistic systems of enterprises integrated within its boundaries.

Table 1 presents the characteristics of the mezo-logical system relative to the position in the general scientific classification of systems, in conjunction with the characteristics of information systems and queuing systems adapted for mezo-logical systems.

Particular attention should be given to the processes of system development, their dynamic characteristics. In this regard, mezo-logical systems should have variable boundaries of controlling parameters. Given the openness of mezo-logical systems, attention should be paid to the methods for studying the conditions and indicators of their activities.

As can be seen from Table 1, by the nature of the system's connection, the systems are differentiated: deterministic - having clear linear connections, and stochastic (complex) - having nonlinear connections.

Table 1. Place and characteristics of the mezological system in the general scientific classification of systems

Characteristic of classification systems	Species classifications systems	Typical characteristics of the mezo-logical system	Note
1	2	3	4
1. General scientific approaches to the classification of mezo-logical systems			
by the origin	systems of natural, artificial, mixed	artificial system	created to improve the efficiency of production, exchange, distribution and related processes
by the objectivity of existence	- real; (material); - Abstract (symbolic) real	- abstract (symbolic) real	system is created for management of material, information, financial and service flows between enterprises
the structure	formation is simple or complex	complex, for all groups of attributes	complex, for all groups of attributes to the signs of complexity include: the volume and sufficiency of information, functional complexity, dynamic complexity.
by the nature of connection with the environment	closed, open, combined	depending on the form of integration open, or combined	- open, with interterritorial and inter-sectoral integration; - combined, in the case of sectoral and inter-territorial integration

by the ability to develop	- stable - and developing; - static and dynamic	developing, dynamic	classification of static and dynamic systems is one of the conditions for choosing the method of research and the formation of indicators that characterize the results of logistics activities
by the nature of the functions	specialized; - multi-functional	multi-functional	Multi-functionality is due to overcoming the industry boundaries, the rarity of specialization in the market conditions of any systems
2. On the classification of information systems in the framework of mezo-logical			
on the complexity	automatic; decisive; self-organized; - transforming foreseeing; of behaviour is a distinctive property of mesological systems;	- the ability to self-organization; - transforming - self-organized	- the ability to transform is associated with integration at the sectoral and territorial levels, which involves changing and adapting the system.
by the nature of the in the system	- deterministic; - stochastic	stochastic	relationships in systems are random due to multifactor influence at the territorial, sectoral and global levels
by the adaptive	adaptive capacity; non-adaptive	- adaptive (homeostatic) -	homeostatic allows us to localize the conflicts of the system, in which its adaptability manifests itself
3.According to the classification of queuing systems in mezo-logical systems			
by the method of selection of applications	open; closed	mainly open	any partner of the association who is open during the selection process
by the character queues	with refusal and with expectation; with priority and without priority	- a system with expectation, - without priority	the introduction of a priority system in mezo-logistics is seen as an exception for strategic sectors of the national economy
by the quantity channel systems	- single-channel; - multichannel	multichannel	multichannel systems differentiate in terms of homogeneity and location

For the analysis of open systems subject to a multifactor effect of the external environment, the inclusion of mezo-logical systems in the group of systems with stochastic constraints is relevant.

The question arises whether a separate classification is necessary for mezo-logical systems in the theory of logistics and what significance it will have for the development of a methodology for managing systems as a whole.

According to the author of this article, the classification of mezo-logical systems will identify their types.

Today, the question of classifying logistic systems as a type of macro- and mezologistics is controversial. In particular, branch logistics systems, traditionally refer to macrologistic. For example, the industry logistic system of the open joint stock company "Russian Railways" can be classified as macrologistic. However, its organizational form - the holding, shows its belonging to the mezo-economic system, as it includes a lot of enterprises that provide the functioning of the transport industry, related to other industries: electricity, finance, education and science, etc.

In addition, the structure of the branch network makes it possible to judge the presence of a sign of inter-territorial interaction of the holding's divisions, that is, the organization of activities at the mezo-level. The same signs have modern transport and logistics and industrial companies, for example:

- production joint-stock company "Transcontainer";
- open joint stock company "RZD-Logistics";
- Production joint-stock company KAMAZ (production and supply of cars);
- Limited Liability Company "PEK" et al.

The presence of links between industries, the existence of centres for the management of technological operations (unimodality), the combination of the horizontal and vertical management, allow us to conclude on the nature of the logistics systems of industry associations. Logistic systems of holdings of transport organizations of open joint-stock companies in Russia are formed as mezo-logical systems.

3. CONCLUSION

Based on the analysis of existing approaches to the classification of systems, it is proposed to systematize knowledge of the mezo-logical system by clarifying its existing features of mezo-economic systems and supplementing them with specific features in logistics

In the course of the study, the types of mezo-logical systems were combined in accordance with the presented features, namely:

1. for the purpose of formation - information and innovation, information technology, distribution optimization, infrastructure development;
2. by organizational form - corporations, associations, concerns, consortiums, pools, syndicates, clusters;
3. on the territory of interaction - regional, national, interregional, transnational;
4. in the form of communication - systems, circuits, networks;
5. in the field of activity - production, transport and logistics, wholesale and retail.

We believe that the mezological system is a supporting subsystem of the mezo-economic system, but apart from the classification features of the mezo-economic system, it has its own classification characteristics. Therefore, the classification of mezological systems proposed in the article partially reflects the conditions and goals of creating mezoeconomic systems, taking into account the features of their formation.

It is proposed to classify mezological systems according to the following groups of features: the goal of mezological system formation; organizational form of the mezo-economic system; territory of interaction; form of communication between elements; sphere of activity (production, transport, information, trade).

Focusing on mezological systems, in the future, one should take into account the variety of forms of their integration. Classification of forms of integration in logistics should be carried out to compare the goals, tasks, the place of formation and the nature of the interrelations of the mezological system.

This scientific field remains open to research as the external environment of functioning of branch mezological systems is heterogeneous, dynamic and has its own specifics.

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